

FORM PTO-1390 (Modified)
(REV 11-2000)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES

DESIGNATED/ELECTED OFFICE (DO/EO/US)

CONCERNING A FILING UNDER 35 U.S.C. 371

220897US6XPCT

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

10/088905INTERNATIONAL APPLICATION NO.
PCT/FR00/02595INTERNATIONAL FILING DATE
19 September 2000PRIORITY DATE CLAIMED
24 September 1999

TITLE OF INVENTION

DEVICE FOR LOCKING A POSITION OF A MOVING PART WITH RESPECT TO A FIXED PART

APPLICANT(S) FOR DO/EO/US

MEYER Guy et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (24) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
 - a. ☐ is attached hereto (required only if not communicated by the International Bureau).
 - b. ☒ has been communicated by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
 - a. ☒ is attached hereto.
 - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ have been communicated by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☒ A copy of the International Search Report (PCT/ISA/210).

Items 13 to 20 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
20. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
21. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
22. ☐ Certificate of Mailing by Express Mail
23. ☒ Other items or information:

Notice of Priority/PCT/IB/308/Drawings (6 sheets)
PCT/IB/304/Form PTO-1449/List of Related Cases
Cited References (5)/Cited Pending Applications (2)

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 1.101) <div style="font-size: 1.5em; font-weight: bold;">10/088905</div>		INTERNATIONAL APPLICATION NO. <div style="font-weight: bold;">PCT/FR00/02595</div>		ATTORNEY'S DOCKET NUMBER <div style="font-weight: bold;">220897US6XPCT</div>	
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24. The following fees are submitted:.

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :	CALCULATIONS PTO USE ONLY				
<input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO	\$1040.00				
<input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO	\$890.00				
<input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO	\$740.00				
<input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4)	\$710.00				
<input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4)	\$100.00				
ENTER APPROPRIATE BASIC FEE AMOUNT =					
		\$890.00			
Surcharge of \$130.00 for furnishing the oath or declaration later than _____ months from the earliest claimed priority date (37 CFR 1.492 (e)). <input type="checkbox"/> 20 <input type="checkbox"/> 30		\$0.00			
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	17 - 20 =	0	x \$18.00	\$0.00	
Independent claims	1 - 3 =	0	x \$84.00	\$0.00	
Multiple Dependent Claims (check if applicable). <input type="checkbox"/>				\$0.00	
TOTAL OF ABOVE CALCULATIONS =				\$890.00	
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				\$0.00	
SUBTOTAL =				\$890.00	
Processing fee of \$130.00 for furnishing the English translation later than _____ months from the earliest claimed priority date (37 CFR 1.492 (f)). <input type="checkbox"/> 20 <input type="checkbox"/> 30				\$0.00	
TOTAL NATIONAL FEE =				\$890.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable). <input type="checkbox"/>				\$0.00	
TOTAL FEES ENCLOSED =				\$890.00	
				Amount to be: refunded	\$
				charged	\$

a. ☒ A check in the amount of \$890.00 to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 15-0030 A duplicate copy of this sheet is enclosed.


d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

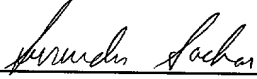
SEND ALL CORRESPONDENCE TO:

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 SIGNATURE

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 NAME

25,599
 REGISTRATION NUMBER

March 25 2002
 DATE

220897US

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :
GUY MEYER ET AL. : ATTN: APPLICATION DIVISION
SERIAL NO: NEW U.S. PCT APPLICATION :
(Based on PCT/FR00/02595)
FILED: HEREWITH :
FOR: DEVICE FOR LOCKING A :
POSITION OF A PART WITH :
RESPECT TO A FIXED PART :

PRELIMINARY AMENDMENT

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

Prior to a first examination on the merits, please amend the above-identified application as follows.

IN THE CLAIMS

Please cancel Claims 1-17 without prejudice.

Please add new Claims 18-34 as follows:

18. (New) A device for locking a position of a moving part with respect to a fixed part, the moving part being positioned with respect to the fixed part isostatically, the device comprising:

means for generating a force opposing a loss of contact of all of points of isostatic contact between the moving part and the fixed part so as to lock the position.

19. (New) The device as claimed in claim 18, wherein to provide isostatic positioning, the device further comprises a female dovetail belonging to the fixed part and a male dovetail belonging to the moving part, wherein bases of the female and male dovetails are in contact and define three first isostatic points, and wherein two inclined faces in contact, each belonging to one of the female and male dovetails, respectively, define fourth and fifth isostatic points.

20. (New) The device as claimed in claim 19, wherein a sixth isostatic point stops translation of the female and male dovetails, with respect to each other, and the sixth isostatic point is formed between a face belonging to the fixed part, which face is inclined with respect to the base of the female dovetail and distinct from the inclined faces of the female dovetail, and a point on the moving part coming into abutment with this face.

21. (New) The device as claimed in claim 19, wherein a direction of force is parallel to the bases of the female and male dovetails.

22. (New) The device as claimed in claim 21, wherein the moving part has a finger configured to move in translation with respect to the moving part and configured to bear against a surface of the fixed part, and wherein a position and orientation of the surface of the fixed part are defined so that the force is directed between the fourth and fifth isostatic points on one hand and the sixth isostatic point on another hand.

23. (New) The device as claimed in claim 22, wherein near a contact between the finger and the surface of the fixed part, the finger is substantially convex and the surface of the fixed part is substantially planar.

24. (New) The device as claimed in claim 22, further comprising an elastic element tending to press the finger against the surface of the fixed part in such a way that the force maintains contact of the first to sixth isostatic points.

25. (New) The device as claimed in claim 22, wherein the fixed part comprises means for compressing the elastic element when the moving part nears its isostatic position with respect to the fixed part without any external action other than action necessary for the bringing-together being needed to compress the elastic element.

26. (New) The device as claimed in claim 22, wherein translational movement of the finger with respect to the moving part is limited in both directions of the translational movement.

27. (New) The device as claimed in claim 23, wherein an orientation of the surface of the fixed part and a coefficient of friction of the finger with respect to the surface are defined such that only a force tending to compress the elastic element can move the moving part with respect to the fixed part.

28. (New) The device as claimed in claim 19, further comprising additional means opposing loss of contact of the fourth and fifth isostatic points.

29. (New) The device as claimed in claim 28, wherein the additional means comprises a facet belonging to the moving part and pressing against an opposite inclined face of the female dovetail to the inclined face of the female dovetail that defines the fourth and fifth isostatic points.

30. (New) The device as claimed in claim 29, wherein the facet belongs to an element configured to move in translation with respect to the moving part along an axis of translation of the finger roughly perpendicular to an axis of travel of the female and male dovetails with respect to each other, and wherein the moving element is connected to the moving part by a second elastic element.

31. (New) The device as claimed in claim 30, wherein the axis of translation of the finger is coincident with an axis of translation of the moving element, and wherein the second elastic element tends to separate the moving element from the finger.

32. (New) The device as claimed in claim 31, wherein the translational movement of the finger of the moving element is guided by a second female dovetail belonging to the moving part in which there slides a second male dovetail secured to the finger and a third male dovetail belonging to the moving element.

33. (New) The device as claimed in claim 31, wherein the moving part is unlocked with respect to the fixed part by exerting a force on the moving element in a direction of the fourth and fifth isostatic points.

34. (New) The device as claimed in claim 31, wherein a stiffness of the elastic element is greater than a stiffness of the second elastic element.

IN THE ABSTRACT

Please cancel the original Abstract on page 17 in its entirety and insert therefor:

ABSTRACT

A device for locking a position of a moving part with respect to a fixed part. The moving part is positioned with respect to the fixed part isostatically. The device generates a force opposing the loss of contact of all the points of isostatic contact between the moving part and the fixed part so as to lock the position.

REMARKS

Favorable consideration of this application, as presently amended, is respectfully requested.

The present Preliminary Amendment is submitted to place the above-identified application in more proper format under United States practice.

By the present Preliminary Amendment original Claims 1-17 are cancelled and new Claims 18-34 are presented for examination. New Claims 18-34 are deemed to be self-evident from the original disclosure, including original Claims 1-17, and thus are not deemed to raise any issues of new matter. Further, new Claims 18-34 are not believed to be more narrow in scope in any aspect in comparison with original Claims 1-17.

A new Abstract believed to be in more proper format under United States practice is also submitted herein.

The present application is believed to be in condition for a full and thorough examination on the merits. An early and favorable consideration of the present application is hereby respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



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220897US

Marked-Up Copy Serial No: Amendment Filed on: <u>3-25-2002</u>
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IN THE CLAIMS

Claims 1-17 (Cancelled).

Claims 18-34 (New).

IN THE ABSTRACT

Abstract (New).

6/ppts

DEVICE FOR LOCKING A POSITION OF A MOVING PART WITH
RESPECT TO A FIXED PART

5 The invention relates to a device for locking a
position of a moving part with respect to a fixed part.

When there is the desire to lock, precisely, the
position of a moving part with respect to a fixed part,
it is necessary to have control both over the relative
10 position of one part with respect to the other and over
the locking of this position.

Isostatic positioning constitutes precise and
repeatable positioning. The locking of such positioning
15 often entails several maneuvers, and this makes the
device more complicated and lengthens the time taken to
operate it.

By way of example, mention may be made of a moving part
20 positioned with respect to a fixed part on a plane in
eliminating three degrees of freedom of the moving part
with respect to the fixed part, in a straight line
parallel to the plane eliminating two other degrees of
freedom, and at a point distinct from the straight line
25 and from the plane and eliminating the last degree of
freedom. To lock this position, use is made of a clamp,
the force of which opposes the loss of contact of the
moving part with respect to the positioning plane.
Before tightening the clamp, it is necessary to apply
30 to the moving part one or more other additional forces
separate from the force applied by the clamp, to press
the moving part against the straight line and the
positioning point. Once the clamp has been tightened,
it is possible to release the additional force or
35 forces. The moving part is then held with respect to
the fixed part against the straight line and the
positioning point by adhesion. In the abovementioned
example, if the additional force or forces are not
sufficient, there is the risk that it will not be

possible to obtain correct bearing against the straight line or the point, and that correct positioning will thus be compromised. In addition, it is necessary to carry out at least two maneuvers in order to lock the position. A first maneuver consists in applying the additional force or forces and a second maneuver consists in tightening the clamp. The need for these numerous maneuvers increases the time taken for positioning and for locking.

10

It is an object of the invention to alleviate these drawbacks by providing a device which is simple and quick to operate.

15 To achieve this object, the subject of the invention is a device for locking a position of a moving part with respect to a fixed part, the moving part being positioned with respect to the fixed part isostatically, characterized in that the device
20 comprises means generating a force opposing the loss of contact of all the points of isostatic contact between the moving part and the fixed part so as to lock the position.

25 One advantage associated with the isostatic positioning is that good repeatability can be attained in successive positionings of the moving part with respect to the fixed part, even if the two parts, or at least their areas of contact, are not produced precisely. The
30 absence of the need for precision also makes it possible to reduce the cost of producing the two parts.

The invention finds a particular use in the mounting of an optomechanical component on a helmet. This component
35 comprises, for example, a pair of night vision goggles.

In this example, it is necessary for the pupil of each half of the goggles to be positioned precisely in front of the eye of the person wearing the helmet. The

invention allows sufficient precision during successive removals and remountings of the optomechanical component. The invention also allows the person wearing the helmet to mount the optomechanical component blind
5 with just one hand, that is to say without being able to see the positioning means and the locking means.

The invention will be better understood and other advantages will become apparent from reading the
10 detailed description of one embodiment of the invention illustrated by the appended drawing in which:

- figure 1 depicts an optomechanical component whose position with respect to a helmet is locked;
- 15 - figure 2 depicts the optomechanical component and the helmet, both depicted in figure 1, some distance apart;
- figure 3 depicts a fixed part;
- figure 4 depicts a moving part;
- 20 - figure 5 depicts an exploded view of the moving part;
- figure 6 depicts a view from above of the moving part in the position in which it is locked with respect to the fixed part;
- 25 - figures 7, 8 and 9 depict, in section, the moving part in position with respect to the fixed part;
- figure 7 depicts an unlocked position;
- figure 9 depicts a locked position;
- figure 8 depicts a position that is intermediate
30 between the unlocked position and the locked position.

For greater convenience, the same topological references will depict the same elements in the various figures.

35

Figures 1 and 2 depict a helmet 1 protecting the head of an individual and night vision goggles 2. In figure 1, the night vision goggles 2 are positioned and locked on the helmet 1. While in figure 2, the goggles 2 and

the helmet 1 are depicted some distance apart. Obviously, the example of the mounting of goggles 2 on a helmet 1 is given merely by way of example and the invention can be used each time there is a desire to
5 mount a moving part, in this instance the goggles 2, on a fixed part, in this instance the helmet 1, and remove it therefrom several times, making sure that the moving part 2 is locked in a precise and repeatable position with respect to the fixed part 1.

10

In the particular embodiment described later on in conjunction with the goggles 2 and the helmet 1, locking and unlocking of the precise position can be achieved very simply with one hand, pressing on a
15 button 3 situated on the moving part 2. This maneuver can be formed without the need to look at the button 3 and this presents an advantage in terms of ergonomics.

20

The fixed part 1 depicted in figure 3 comprises means for providing isostatic positioning of the moving part 2, not depicted in this figure. These means comprise, for example, a female dovetail 30. The female dovetail 30 comprises a base 31 which is roughly planar and two inclined faces 32 and 33. The slope of each of the two
25 inclined faces forms an acute angle with the base 31. The slopes of each inclined face 32 and 33 are advantageously equal. The intersections between the inclined faces 32 and 33 and the base form two parallel straight lines. Advantageously, to make the female
30 dovetail 30 easier to produce, the intersections may be partially filled by a fillet or a meeting plane joining the inclined face 32 and 33 and the base 31 of the female dovetail 30.

35

In figure 3, a plane 34 connects the inclined face 32 to the base 31 and a plane 35 connecting the inclined face 33 to the base 31. The planes 34 and 35 are, for example, roughly parallel and perpendicular to the base 31. The female dovetail 30 opens to the outside for

example along a plane 36 perpendicular to the base 41 and to the planes 34 to 35.

5 The female dovetail 30 allows a translational movement of a complimentary male dovetail belonging to the moving part 2 along an axis 41 roughly perpendicular to the plane 36. The male dovetail will be described later.

10 The female dovetail 30 also provides a means for stopping the translation of the male dovetail sliding in the female dovetail 30. This means comprises, for example, an inclined face 37, the gradient of whose slope, with respect to the base 31, is roughly similar
15 to the gradient of the slope of the inclined faces 32 and 33. The inclined face 37 is roughly planar. Its intersection with the base 31 is roughly perpendicular to the intersections between the inclined faces 32 and 33 and the base 31.

20 Advantageously, a plane 42, roughly perpendicular to the base 31, partially fills the intersection between the inclined face 37 and the base 31.

25 Advantageously, fillets are provided between the inclined face 37 and each of the inclined faces 32 and 33. In figure 3, the perspective depiction means that only the fillet between the inclined face 32 and the inclined face 42 is visible.

30 Fillets are likewise provided between the plane 42 and each of the planes 34 and 35.

35 Hollowed into the base 31, the fixed part has a groove 38 formed of a bottom roughly parallel to the base 31 and of sides which are roughly planar and perpendicular to the base 31.

From the plane 36, where the groove 38 opens to the outside, the groove 38 extends first of all roughly parallel to the planes 34 and 35 and then inclines by an angle smaller than 90° , for example in the direction
5 of the plane 34.

A finger 50 belonging to the moving part can slide in the groove 38, bearing against its sides. The finger 50 will be described later on. Advantageously, to avoid
10 premature wear of the base 31 when the finger 50 of the moving part 2 rubs against the sides of the groove 38, the groove 38 may be made in an attached part 39 made of a material that is harder than the remainder of the fixed part 1. This makes it possible to produce the
15 remainder of the female dovetail 30 from a softer material such as, for example, a plastic, and thus to reduce the mass of the fixed part 1. The attached part 39 is made, for example, of steel.

Figure 4 shows the moving part 2 which comprises the male dovetail 45 that compliments the female dovetail 30. The male dovetail 45 comprises a base 46 and two inclined faces 48 and 49 clearly visible in figure 5. The male dovetail 45 comprises an end 47 intended to
25 come into contact with the inclined face 37, which end is advantageously not planar but roughly of revolution about an axis perpendicular to the base 46 and lying roughly midway between the two inclined faces 48 and 49. Thus, contact between the inclined base 37 and the
30 end 47 will be more or less point contact.

The intersections between the inclined faces 47, 48 and 49 and the base 46 are truncated by surfaces which, for example, are roughly planar so that these surfaces
35 cannot come into contact with the planes 34, 35, and 42 of the female dovetail 30.

The finger 50, clearly visible in figure 4, protrudes from the base 46. It is roughly cylindrical. Its

diameter is slightly smaller than the width of the groove 38 so that it can move therein. Its height, measured with respect to the base 46, is slightly less than the depth of the groove 38, the depth being measured at right angles to the base 31, so that only the cylindrical part of the finger 50 is in contact with the sides of the groove 38. The finger 50 can move in translation with respect to the remainder of the moving part 2 roughly along an axis 51 contained in a plane parallel to the base 46 and perpendicular to the axis 41. The translational movement of the finger 50 with respect to the moving part 2 is limited in both directions of translation, for example by means of an oblong hole 52 made in the base 46, and through which the finger 50 passes.

In figure 4, it is also possible to make out the button 3 which allows the finger 50 to be moved in translation along the axis 51. The button 3 may be secured to the finger 50 but may advantageously move in translation with respect to the remainder of the moving part 2 along the axis 51 independently of the finger 50. As with the finger 50, the translational movement of the button 3 is limited for example by means of a stud 53 secured to the button 3, the stud 53 being able to move in an oblong hole 54 made in the base 46. Unlike the finger 50, the stud 53 does not protrude from the base 46 so as not to impede the translational movement along the axis 41 of the male dovetail 45 with respect to the female dovetail 30.

When the button 3 is not secured to the finger 50 it comprises a facet 57, for example one roughly parallel to the inclined face 48 and intended to bear against the inclined face 32 of the female dovetail 30.

Means of guiding the translational movement of the button 3 and of the finger 50 along the axis 51 are provided in the moving part 2. The guide means

comprise, for example, a second pair of dovetails. This second pair comprises a small female dovetail 54 made in the body of the moving part 2 and two small male dovetails 55 and 56, one of them, 55, made in the button 3 and the other of them, 56, secured to the finger 56. Advantageously, the axis 51 of travel of the second pair is perpendicular to the axis 41 of travel of the first pair of dovetails.

10 An elastic element 58 is provided to tend to bring the finger 50 closer to one of the ends of the oblong hole 52. When pressure is exerted on the button 3, the elastic element 58 is compressed. This elastic element comprises, for example, two helical springs.

15 When the button 3 is not secured to the finger 50, the moving part comprises a second elastic element 59 tending to separate the button 3 from the finger 50. The second elastic element 59 may also comprise two
20 helical springs. The function of the two elastic elements 58 and 59 will be described in greater detail by means of figures 7 to 9.

Figure 6 depicts the male dovetail 45 engaged in the
25 female dovetail 30. The end 47 of the male dovetail 45 is in contact with the inclined face 47 of the female dovetail 30. The finger 50 is, for its part, in contact with one of the sides 60 of the groove 38. The side 60 is advantageously a roughly planar surface
30 perpendicular to the base 46 and forming an acute angle with the axis 51. The value of the acute angle is, for example, of the order of 15° . The finger 50 has a convex shape, for example circular, so as to make roughly point contact between the finger 50 and the
35 side 60 which is roughly planar. Advantageously, the finger 50 comprises a means for limiting its friction with the side 60. This means comprises, for example, a ball bearing, the outer cage of which is in contact with the side 60. The inner cage of this bearing will

be fixed to the small male dovetail 56. Thus, when the elastic element 58 pushes the finger 50 back against the side 60, the female part 1 generates a force F on a the male part 2, the force being directed roughly at right angles to the side 60.

The force F has the effect of pressing the male dovetail 45 into the female dovetail 30.

More specifically, when the force F presses the male dovetail 45 against the inclined faces 33 and 37 of the female dovetail 30, it also tends to press the base 46 of the male dovetail 45 against the base 31 of the female dovetail 30. The two bases 31 and 46 in contact form a planar contact defining three points 61, 62 and 63 of isostatic positioning. Furthermore, the contact between the male dovetail 45 and the inclined face 33 needs to be long enough to embody a line of contact which defines two additional isostatic points 64 and 65. Finally, the last point of isostatic positioning 66 is defined, at the roughly point contact, between the end 47 of the male dovetail 45 and the inclined face 37. This last isostatic point 66 halts the translational movement of the two dovetails one with respect to the other. Of course, the dovetails 30 and 45 are given merely by way of example and any other means of positioning, between the moving part 2 and the fixed part 1, culminating in isostatic positioning, will make it possible for the moving part 2 to be repositioned precisely with respect to the fixed part 1.

The elastic element 58 tends to press the finger 50 against the side 60 so that the force F maintains the contact of the six isostatic points 60 to 66.

The orientation of the side 60 is such that the direction of the force F is parallel to the bases 31 and 46 of the two dovetails 30 and 45. In addition, the

position and orientation of the side 60 is such that the direction of the force F passes between the fourth and fifth isostatic points 64 and 65 on the one hand, and the sixth isostatic point 67 on the other hand, so
5 as to avoid any loss of contact of one of these points.

Advantageously, the orientation of the side 60 and the coefficient of friction of the finger 50 with respect to the side 60 are defined so that only a force tending
10 to compress the elastic element 58 can cause the moving part 2 to move with respect to the fixed part 1, thus avoiding the possibility of any force, particularly a force the direction of which is denoted 41, being able to cause the moving part 2 to move with respect to the
15 fixed part 1. It is possible to degrade this characteristic slightly by defining the orientation of the side 60 and the coefficient of friction in such a way that, in order to uncouple the dovetails 30 and 45 without acting on the button 3, it would be necessary
20 to produce a very significant force.

When the button 3 is not secured to the finger 50, the facet 57 exerts a force $-F_1$ on the inclined face 32 of the female dovetail 30. The force $-F_1$ is generated by
25 the elastic elements 58 and 59. It is carried along the axis 51. Figure 6 depicts the reaction F_1 , opposing the force $-F_1$, of the inclined face 32 on the moving part 2. The reaction F_1 , combined with the force F , improves the contact of the moving part 2 on the two points of
30 isostatic contact 64 and 65.

The directions of each of the two forces F and F_1 are parallel to the bases 31 and 46 of the two dovetails 30 and 45.
35

The facet 57 and the elastic element 59 form additional means opposing the loss of contact of the two isostatic points 64 and 65.

Figures 7, 8 and 9 allow a better understanding of the locking and unlocking of the moving part 2 with respect to the fixed part 1. These figures depict a device according to the invention in which the button 3 is not
5 secured to the finger 50. The three figures 7 to 9 are depicted in section on a plane parallel to the plane 36 and containing the axis 51. In the three figures, the moving part 2 is set in position with respect to the fixed part 1.

10 In figure 7, a user, not depicted, is pressing on the button 3 in the direction of the inclined face 33. The two elastic elements 58 and 59 are compressed and the finger 50 is bearing against one of the sides of the
15 groove 38 in such a way as to allow the male dovetail 45 to leave the female dovetail 30.

In the position depicted in figure 8, the button 3 has been partially released. The stiffness of the elastic
20 element 58 is chosen to be higher than that of the elastic element 59 so that in this position, the finger 50 comes to bear against the side 60 of the groove 38 while the button 3 remains bearing against the finger 50. In figure 8, the side 60 is not visible because it
25 is in front of the plane of section. In this position, locking of the isostatic position has already been achieved when the finger 50 bears against the side 60. However, this locking is advantageously supplemented by completely releasing the button 3, until the position
30 depicted in figure 9 is reached.

In this position, the finger 50 is still bearing against the side 60 and, in addition, as the elastic
35 element 59 relaxes, the facet 57 of the button 3 comes to bear against the inclined face 32 of the female dovetail 30.

Advantageously, the groove 38 has a side 67, visible in figure 6. The side 67 is parallel to the side 60. The

two sides 60 and 67 are spaced apart by a distance that slightly exceeds the diameter of the finger 50 so that the finger 50 is never in contact with both sides 60 and 67 at the same time. In the locked position, depicted in figure 9, the finger 50 is bearing against the side 60 and when pressure is applied to the button 3, the finger 50 comes into contact with the side 67 so that the side 67 exerts a force opposing the force F on the finger 50 which helps with disengaging the male dovetail 45 from the female dovetail 30.

Advantageously too, the fixed part comprises means for compressing the elastic element 58 when the moving part 2 nears its isostatic position with respect to the fixed part 1 without any external action other than that necessary for the bringing together being required to compress the elastic element 58. These means comprise, for example, at least one entry chamfer 40 allowing the finger 50 to move to enter the groove 36 during the bringing-together. In figure 3, two chamfers 40 widening the entry to the groove 38 have been depicted. These means make it possible to avoid pressing on the button 3 during the bringing-together.

When the button 3 is not secured to the finger 50, means are also provided so that when the moving part 2 nears the isostatic position, the elastic element 59 is compressed even when no action is exerted on the button 3. These means comprise, for example, a chamfer produced on the inclined face 32 or on the facet 57.

CLAIMS

1. A device for locking a position of a moving part (2) with respect to a fixed part (1), the moving part (2) being positioned with respect to the fixed part (1) isostatically, the device being characterized in that it comprises means (50, 58, 60) generating a force (F, F1) opposing the loss of contact of all the points (61 to 66) of isostatic contact between the moving part (2) and the fixed part (1) so as to lock the position.

2. The device as claimed in claim 1, characterized in that, in order to provide isostatic positioning, the device comprises a female dovetail (30) belonging to the fixed part (1) and a male dovetail (45) belonging to the moving part (2), in that the bases (31, 46) of the two dovetails (30, 45) are in contact and define three first isostatic points (61, 62, 63) and in that two inclined faces (33, 49) in contact, each belonging to one of the dovetails (30, 45), define the forth and fifth isostatic points (64, 65).

3. The device as claimed in claim 2, characterized in that the sixth isostatic point (66) stops translation of the two dovetails (30, 45), one with respect to the other, and in that the sixth point (66) is formed between a face (37) belonging to the fixed part (1), which face is inclined with respect to the base (31) of the female dovetail (30) and distinct from the inclined faces (32, 33) of the female dovetail (30), and a point (47) on the moving part (2) coming into abutment with this face (42).

4. The device as claimed in either of claims 2 and 3, characterized in that the direction of the force (F, F1) is parallel to the bases (31, 46) of the dovetails (30, 45).

5. The device as claimed in claims 3 and 4, characterized in that the moving part (2) has a finger (50) that can move in translation with respect to the moving part (2) and is intended to bear against a surface (60, 67) of the fixed part (1), and in that the position and orientation of the surface (60, 67) are defined so that the force is directed between the fourth and fifth isostatic points (64, 65) on the one hand, and the sixth isostatic point (67) on the other hand.

6. The device as claimed in claim 5, characterized in that near the contact between the finger (50) and the surface (60, 67), the finger (50) is roughly convex and the surface (60, 67) is roughly planar.

7. The device as claimed in claim 5, characterized in that an elastic element (58) tends to press the finger (50) against the surface (60) in such a way that the force (F) maintains the contact of the six isostatic point (60 to 66).

8. The device as claimed in any of claims 5 to 7, characterized in that the fixed part (1) comprises means (40) for compressing the elastic element (58, 59) when the moving part (2) nears its isostatic position with respect to the fixed part (1) without any external action other than the action necessary for the bringing-together being needed to compress the elastic element (58, 59).

9. The device as claimed in any of claims 5 to 8, characterized in that the translational movement of the finger (50) with respect to the moving part (2) is limited in both the directions of the translational movement.

10. The device as claimed in any of claims 5 to 9, characterized in that the orientation of the surface

(6) and the coefficient of friction of the finger (50) with respect to the surface (60) are defined such that only a force tending to compress the elastic element (58) can move the moving part (2) with respect to the
5 fixed part (1).

11. The device as claimed in any of claims 2 to 10, characterized in that it further comprises additional means (57) opposing the loss of contact of the fourth
10 and fifth isostatic points (64, 65).

12. The device as claimed in claim 11, characterized in that the additional means comprise a facet (57) belonging to the moving part (2) and pressing against
15 the opposite inclined face (32) of the female dovetail (30) to the inclined face (33) of the female dovetail (30) that defines the fourth and fifth isostatic points (64, 65).

20 13. The device as claimed in claim 12, characterized in that the facet (57) belongs to an element (3) that can move in translation with respect to the moving part (2) along an axis (51) roughly perpendicular to the axis (41) of travel of the dovetails (30, 45) one with
25 respect to the other, and in that the moving element (3) is connected to the moving part (2) by a second elastic element (59).

14. The device as claimed in claims 5 and 13,
30 characterized in that the axis (51) of translation of the finger (50) is coincident with the axis of translation of the moving element (3) and in that the second elastic element (59) tends to separate the moving element (3) from the finger (50).

35 15. The device as claimed in claim 14, characterized in that the translational movement of the finger (50) of the moving element (3) is guided by means of a second female dovetail (54) belonging to the moving

part (2) in which there slides a second male dovetail (56) secured to the finger (50) and a third male dovetail (55) belonging to the moving element (3).

5 16. The device as claimed in either of claims 14 and 15, characterized in that the moving part (2) is unlocked with respect to the fixed part (1) by exerting a force on the moving element (3) in the direction of the fourth and fifth isostatic points (64, 65).

10

17. The device as claimed in any of claims 14 to 16, characterized in that the stiffness of the elastic element (58) is greater than the stiffness of the second elastic element (59).

15

ABSTRACT**DEVICE FOR LOCKING A POSITION OF A MOVING PART WITH
RESPECT TO A FIXED PART**

The invention relates to a device for locking a position of a moving part with respect to a fixed part. The moving part (2) is positioned with respect to the fixed part (1) isostatically. The device comprises means (50, 58, 60) generating a force (F) opposing the loss of contact of all the points (61 to 66) of isostatic contact between the moving part (2) and the fixed part (1) so as to lock the position.

figure 2

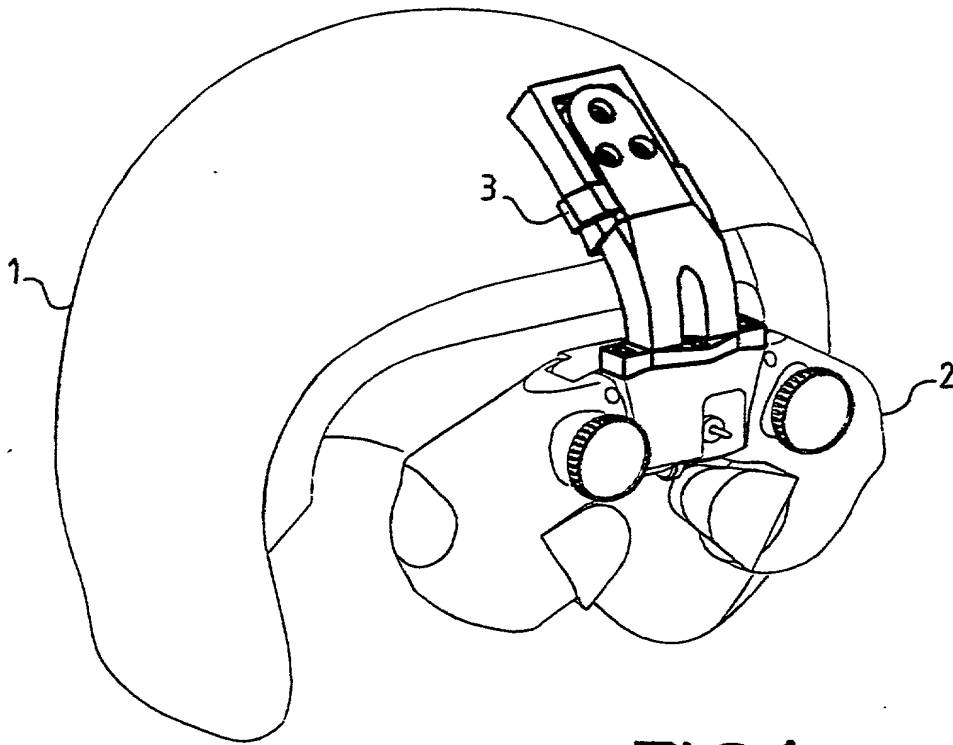
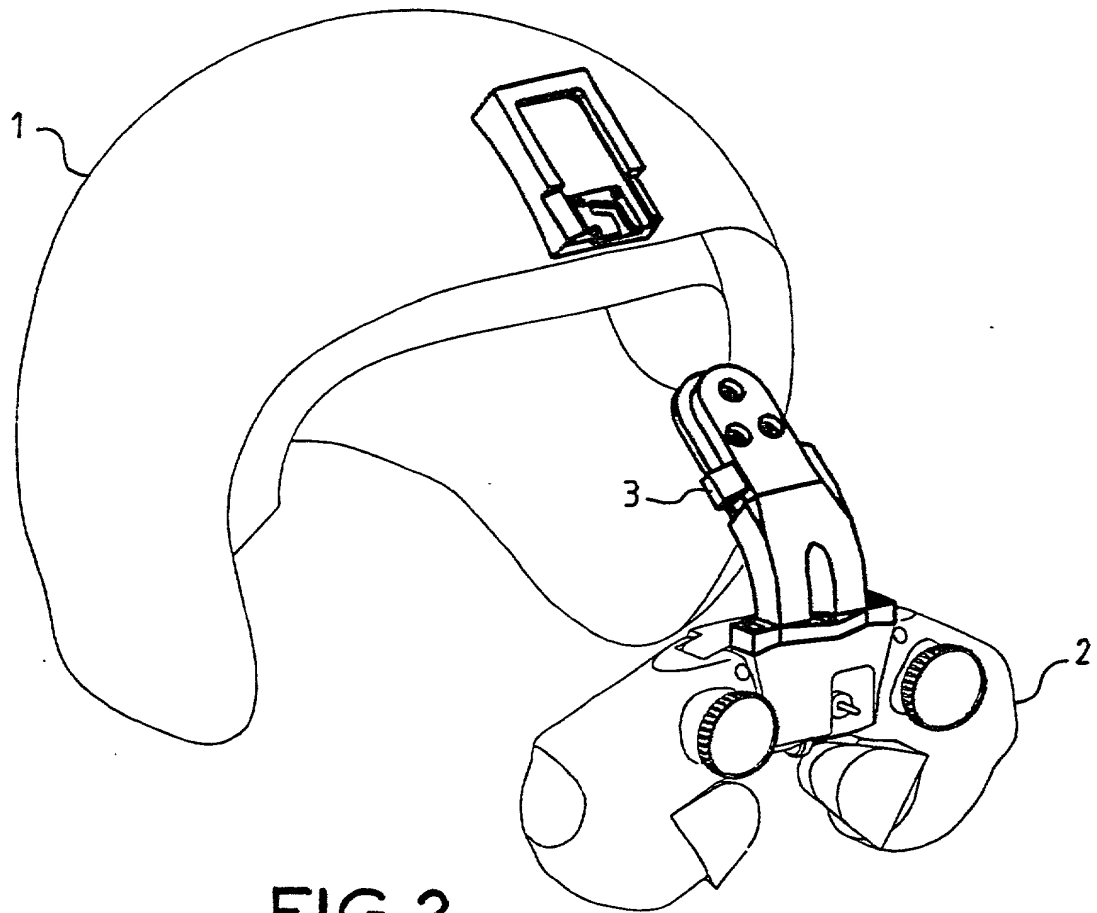
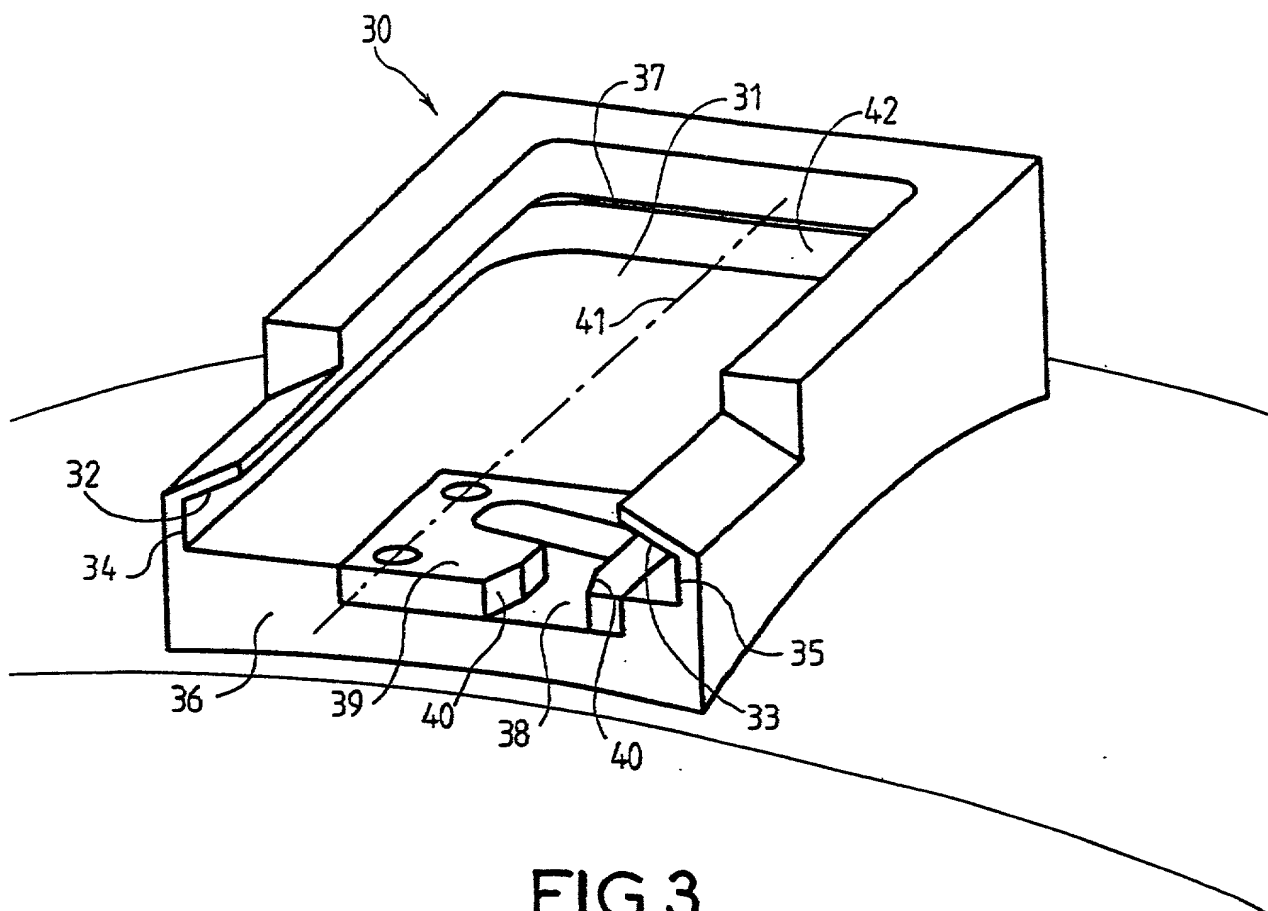


FIG.1





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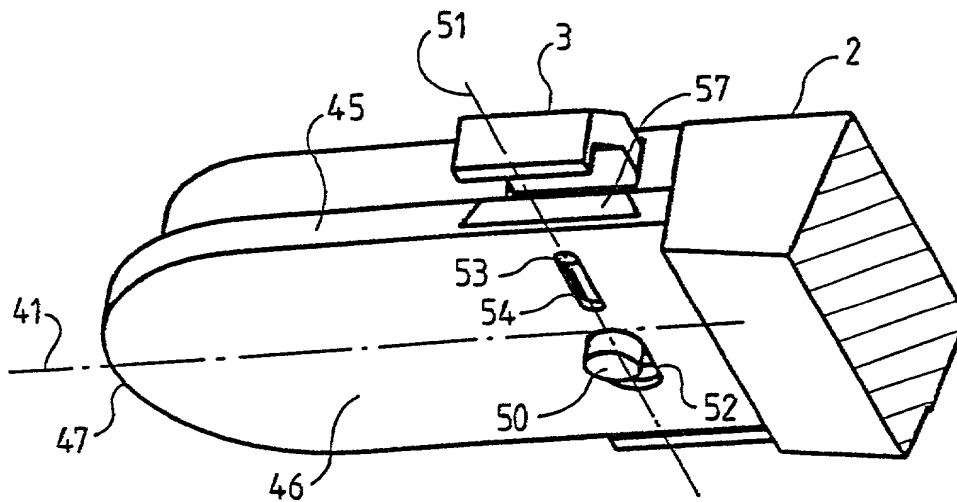


FIG. 4

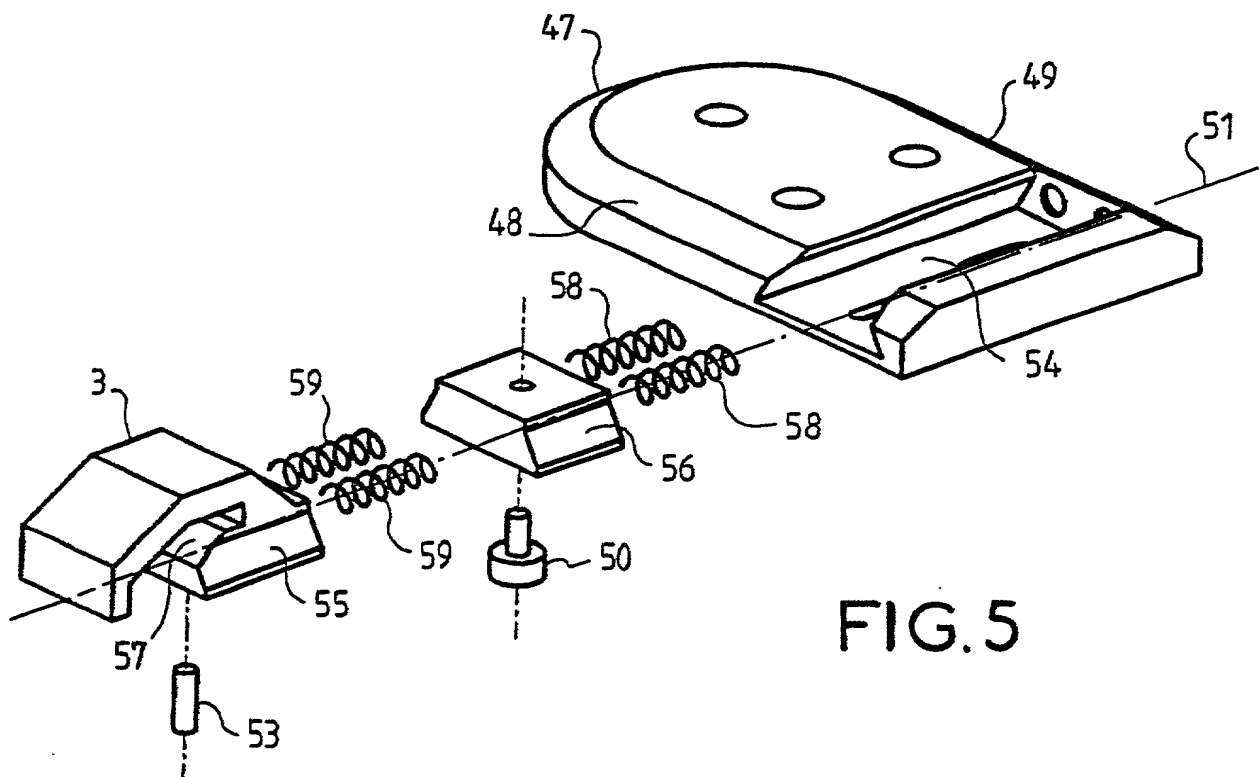
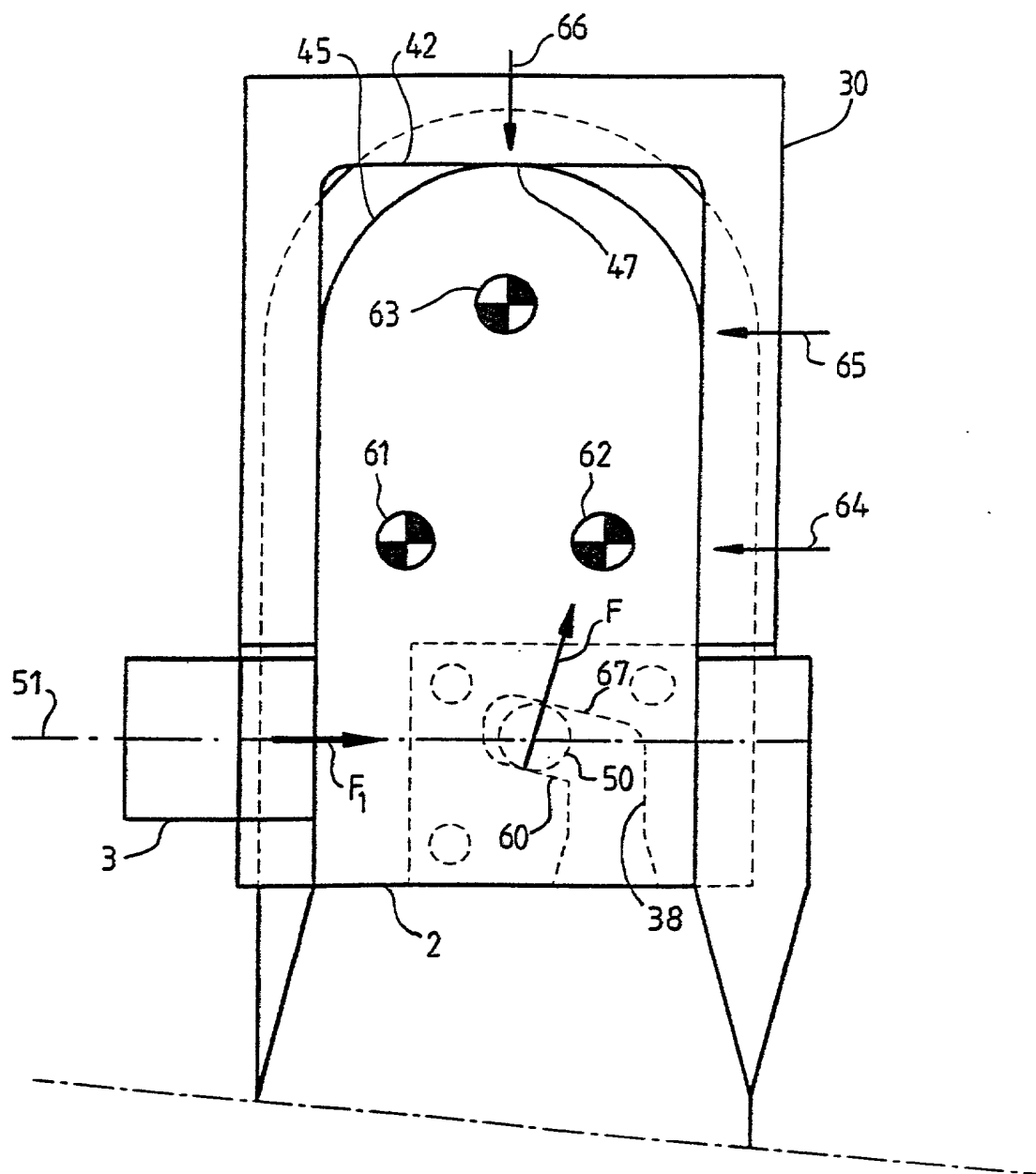


FIG. 5

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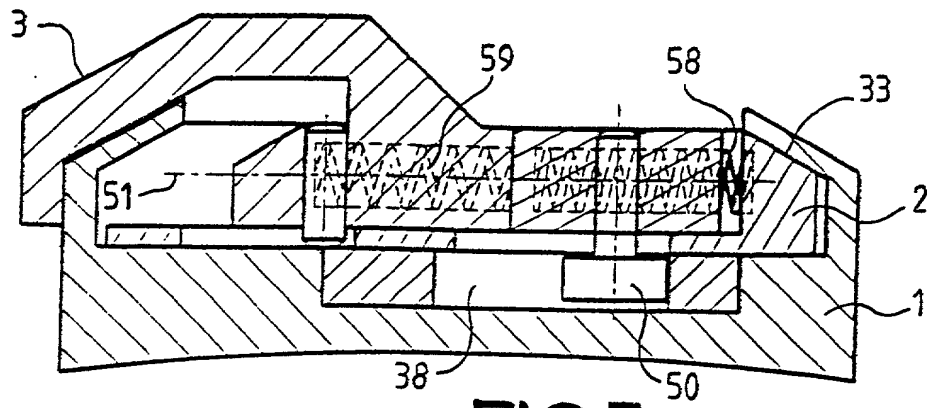


FIG. 7

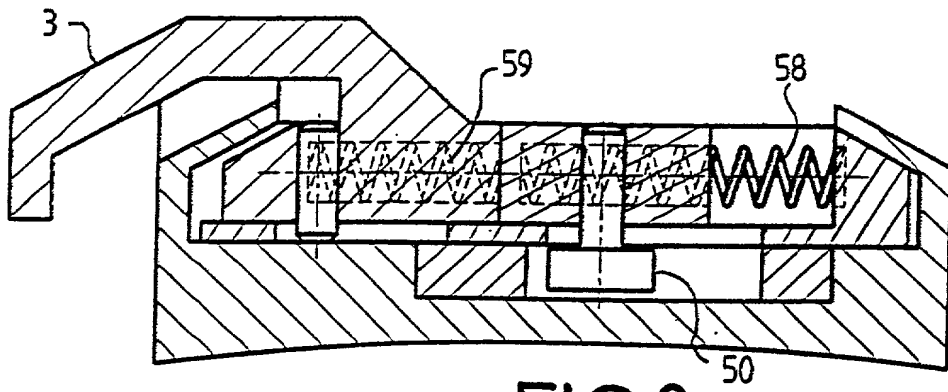


FIG. 8

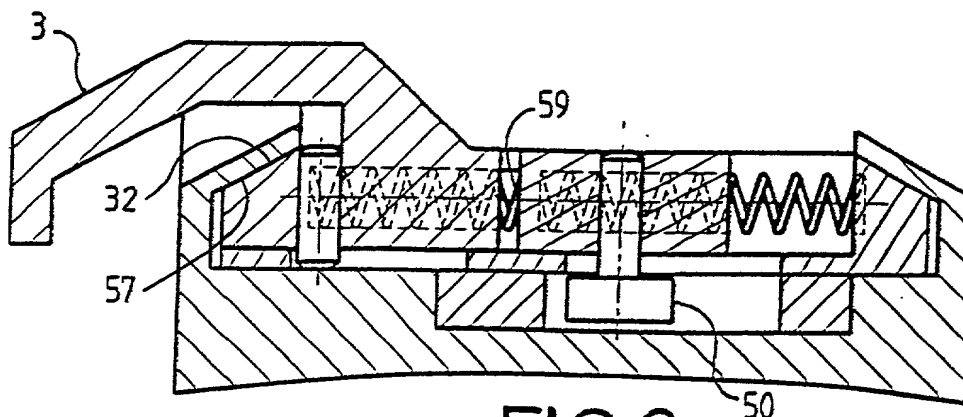


FIG. 9

Declaration and Power of Attorney for Patent Application

Déclaration et Pouvoirs pour Demande de Brevet

French Language Declaration

En tant l'inventeur nommé ci-après, je déclare par le présent acte que:

Mon domicile, mon adresse postale et ma nationalité sont ceux figurant ci-dessous à côté de mon nom.

Je crois être le premier inventeur original et unique (si un seul nom est mentionné ci-dessous), ou l'un des premiers co-inventeurs originaux (si plusieurs noms sont mentionnés ci-dessous) de l'objet revendiqué, pour lequel une demande de brevet a été déposée concernant l'invention intitulée

et dont la description est fournie ci-joint

☐ ci-joint

☐ a été déposée le _____

sous le numéro de demande des Etats-Unis ou le numéro de demande international PCT

_____ et modifiée le

_____ (le cas échéant).

Je déclare par le présent acte avoir passé en revue et compris le contenu de la description ci-dessus, revendications comprises, telles que modifiées par toute modification dont il aura été fait référence ci-dessus.

Je reconnais devoir divulguer toute information pertinente à la brevetabilité, comme défini dans le Titre 37, § 1.56 du Code fédéral des réglementations.

As a below named inventor, I hereby declare that:

My residence, mailing address and citizenship are as stated next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled.

DEVICE FOR LOCKING A POSITION OF A PART WITH RESPECT TO A FIXED PART

the specification of which

☐ is attached hereto.

☒ was filed on September 19, 2000

as United States Application Number or PCT International Application Number

PCT/FR00/02595 and was amended on

_____ (if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

French Language Declaration

Je revendique par le présent acte avoir la priorité étrangère, en vertu du Titre 35, § 119(a)-(d) ou § 365(b) du Code des Etats-Unis, sur toute demande étrangère de brevet ou certificat d'inventeur ou, en vertu du Titre 35, § 365(a) du même Code, sur toute demande internationale PCT désignant au moins un pays autre que les Etats-Unis et figurant ci-dessous et, en cochant la case, j'ai aussi indiqué ci-dessous toute demande étrangère de brevet, tout certificat d'inventeur ou toute demande internationale PCT ayant une date de dépôt précédant celle de la demande à propos de laquelle une priorité est revendiquée.

Prior Foreign Application(s)
Demande(s) de brevet antérieure(s) dans un autre pays.

99 11969

(Number)
(Numéro)

FRANCE

(Country)
(Pays)

(Number)
(Numéro)

(Country)
(Pays)

Je revendique par le présent acte tout bénéfice, en vertu du Titre 35, § 119(e) du Code des Etats-Unis, de toute demande de brevet provisoire effectuée aux Etats-Unis et figurant ci-dessous.

(Application No.)
(N° de demande)

(Filing Date)
(Date de dépôt)

Je revendique par le présent acte tout bénéfice, en vertu du Titre 35, § 120 du Code des Etats-Unis, de toute demande de brevet effectuée aux Etats-Unis, ou en vertu du Titre 35, § 365(c) du même Code, de toute demande internationale PCT désignant les Etats-Unis et figurant ci-dessous et, dans la mesure où l'objet de chacune des revendications de cette demande de brevet n'est pas divulgué dans la demande antérieure américaine ou internationale PCT, en vertu des dispositions du premier paragraphe du Titre 35, § 112 du Code des Etats-Unis, je reconnais devoir divulguer toute information pertinente à la brevetabilité, comme défini dans le Titre 37, § 1.56 du Code fédéral des réglementations, dont j'ai pu disposer entre la date de dépôt de la demande antérieure et la date de dépôt de la demande nationale ou internationale PCT de la présente demande:

PCT/FR00/02595

(Application No.)
(N° de demande)

September 19, 2000

(Filing Date)
(Date de dépôt)

(Application No.)
(N° de demande)

(Filing Date)
(Date de dépôt)

Je déclare par le présent acte que toute déclaration ci-incluse est, à ma connaissance, véridique et que toute déclaration formulée à partir de renseignements ou de suppositions est tenue pour véridique; et de plus, que toutes ces déclarations ont été formulées en sachant que toute fausse déclaration volontaire ou son équivalent est passible d'une amende ou d'une incarcération, ou des deux, en vertu de la § 1001 du Titre 18 du Code des Etats-Unis, et que de telles déclarations volontairement fausses risquent de compromettre la validité de la demande de brevet ou du brevet délivré à partir de celle-ci.

I hereby claim foreign priority under Title 35, United States Code, § 119 (a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Priority Claimed
Droit de priorité
Revendiqué

24 September 1999

(Day/Month/Year Filed)
(Jour/Mois/Année de dépôt)

☒

Yes
Oui

☐

No
Non

(Day/Month/Year Filed)
(Jour/Mois/Année de dépôt)

☐

Yes
Oui

☐

No
Non

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States provisional application(s) listed below.

(Application No.)
(N° de demande)

(Filing Date)
(Date de dépôt)

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

(Status: Patented, Pending, Abandoned)
(Statut : breveté, en cours d'examen, abandonné)

(Status: Patented, Pending, Abandoned)
(Statut : breveté, en cours d'examen, abandonné)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

French Language Declaration

POUVOIRS: En tant que l'inventeur cité, je désigne par la présente l'(les) avocat(s) et/ou agent(s) suivant(s) pour qu'ils poursuive(nt) la procédure de cette demande de brevet et traite(nt) toute affaire s'y rapportant avec l'Office des brevets et des marques (mentionner le nom et le numéro d'enregistrement)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: (list name and registration number)

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